

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
MC	$65.0 \pm 4.3$	$55.7 \pm 4.1$	$19.6 \pm 2.5$	$19.8 \pm 2.7$	$7.4 \pm 2.3$	$2.2 \pm 0.5$	$1.0 \pm 0.4$	$0.9 \pm 0.4$
Data	103.0	94.0	35.0	32.0	12.0	8.0	4.0	2.0
Data/MC	$1.58 \pm 0.19$	$1.69 \pm 0.21$	$1.79 \pm 0.38$	$1.61 \pm 0.36$	$1.61 \pm 0.68$	$3.68 \pm 1.58$	$3.92 \pm 2.38$	$2.14 \pm 1.72$
DY MC	$50.4 \pm 4.2$	$42.1 \pm 4.1$	$10.4 \pm 2.2$	$9.6 \pm 2.5$	$3.6 \pm 2.2$	$0.4 \pm 0.2$	$0.1 \pm nan$	$0.1 \pm nan$
DY Data	$87.9 \pm 10.2$	$79.9 \pm 9.8$	$25.5 \pm 6.0$	$21.4 \pm 5.8$	$8.0 \pm 3.5$	$6.1 \pm 2.9$	$3.0 \pm 2.0$	$1.2 \pm 1.5$
DY Data/MC	$1.74 \pm 0.25$	$1.90 \pm 0.30$	$2.45 \pm 0.78$	$2.24 \pm 0.84$	$2.20 \pm 1.67$	$15.74 \pm 10.82$	$32.68 \pm nan$	$9.12 \pm nan$
$SFR_{top}$	$1.66 \pm 0.38$	$1.79 \pm 0.45$	$2.12 \pm 0.67$	$1.93 \pm 0.59$	$1.90 \pm 0.82$	$9.71 \pm 4.63$	$18.30 \pm 8.97$	$5.63 \pm 2.88$

Table 1:  $19.5/\text{fb} \geq 4$ -jet yields in  $M_T$  tail comparing the DY MC prediction (after applying SFs) to data without subtracting the non-DY components (top table) and with subtracting the non-DY components (bottom table).

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
MC	$83.2 \pm 1.4$	$59.0 \pm 1.4$	$15.3 \pm 1.2$	$17.2 \pm 1.3$	$5.4 \pm 0.7$	$2.4 \pm 0.5$	$1.2 \pm 0.3$	$0.9 \pm 0.3$
Data	103.0	94.0	35.0	32.0	12.0	8.0	4.0	2.0
Data/MC	$1.24 \pm 0.12$	$1.59 \pm 0.17$	$2.28 \pm 0.43$	$1.87 \pm 0.36$	$2.24 \pm 0.72$	$3.38 \pm 1.39$	$3.46 \pm 2.00$	$2.23 \pm 1.78$
DY MC	$68.6 \pm 1.2$	$45.4 \pm 1.1$	$6.2 \pm 0.3$	$6.9 \pm 0.5$	$1.5 \pm 0.2$	$0.6 \pm 0.1$	$0.2 \pm 0.1$	$0.1 \pm 0.0$
DY Data	$87.9 \pm 10.2$	$79.9 \pm 9.8$	$25.5 \pm 6.0$	$21.4 \pm 5.8$	$8.0 \pm 3.5$	$6.1 \pm 2.9$	$3.0 \pm 2.0$	$1.2 \pm 1.5$
DY Data/MC	$1.28 \pm 0.15$	$1.76 \pm 0.22$	$4.14 \pm 1.00$	$3.10 \pm 0.88$	$5.17 \pm 2.40$	$10.58 \pm 5.42$	$13.31 \pm 9.77$	$12.89 \pm 17.28$
$SFR_{top}$	$1.26 \pm 0.18$	$1.68 \pm 0.38$	$3.21 \pm 1.19$	$2.48 \pm 0.82$	$3.70 \pm 1.53$	$6.98 \pm 3.30$	$8.38 \pm 4.20$	$7.56 \pm 3.73$

Table 2: After resampling all DY events by rotating the  $l^+l^-$  in the Z CM (both  $\theta$  and  $\phi$ ).

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
MC	$60.7 \pm 1.4$	$51.8 \pm 1.4$	$17.1 \pm 1.2$	$19.9 \pm 1.3$	$5.9 \pm 0.7$	$2.5 \pm 0.5$	$1.2 \pm 0.3$	$0.9 \pm 0.3$
Data	103.0	94.0	35.0	32.0	12.0	8.0	4.0	2.0
Data/MC	$1.70 \pm 0.17$	$1.82 \pm 0.19$	$2.04 \pm 0.37$	$1.61 \pm 0.30$	$2.04 \pm 0.64$	$3.16 \pm 1.28$	$3.31 \pm 1.90$	$2.20 \pm 1.75$
DY MC	$46.1 \pm 0.8$	$38.2 \pm 1.0$	$8.0 \pm 0.4$	$9.6 \pm 0.8$	$2.1 \pm 0.3$	$0.7 \pm 0.1$	$0.3 \pm 0.1$	$0.1 \pm 0.1$
DY Data	$87.9 \pm 10.2$	$79.9 \pm 9.8$	$25.5 \pm 6.0$	$21.4 \pm 5.8$	$8.0 \pm 3.5$	$6.1 \pm 2.9$	$3.0 \pm 2.0$	$1.2 \pm 1.5$
DY Data/MC	$1.91 \pm 0.22$	$2.09 \pm 0.26$	$3.21 \pm 0.77$	$2.22 \pm 0.63$	$3.84 \pm 1.78$	$8.19 \pm 4.19$	$10.82 \pm 7.94$	$11.35 \pm 15.24$
$SFR_{top}$	$1.80 \pm 0.44$	$1.95 \pm 0.51$	$2.63 \pm 0.89$	$1.92 \pm 0.55$	$2.94 \pm 1.16$	$5.67 \pm 2.66$	$7.06 \pm 3.58$	$6.77 \pm 3.38$

Table 3: After resampling all DY events by rotating the  $l^+l^-$  in the Z CM (both  $\theta$  and  $\phi$ ), and cutting on lepton  $p_T < 20$  GeV and  $|\eta| > 2.4$  after resampling.

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
MC	$78.9 \pm 1.3$	$66.8 \pm 1.3$	$21.7 \pm 1.2$	$23.7 \pm 1.2$	$6.8 \pm 0.7$	$3.4 \pm 0.6$	$1.7 \pm 0.5$	$1.3 \pm 0.5$
Data	146.0	128.0	44.0	42.0	12.0	8.0	4.0	2.0
Data/MC	$1.85 \pm 0.16$	$1.92 \pm 0.17$	$2.03 \pm 0.32$	$1.77 \pm 0.29$	$1.76 \pm 0.54$	$2.37 \pm 0.95$	$2.29 \pm 1.29$	$1.50 \pm 1.18$
DY MC	$62.7 \pm 0.9$	$51.5 \pm 1.1$	$11.3 \pm 0.5$	$13.9 \pm 0.9$	$2.8 \pm 0.3$	$0.9 \pm 0.2$	$0.4 \pm 0.1$	$0.1 \pm 0.1$
DY Data	$129.1 \pm 12.2$	$112.1 \pm 11.4$	$33.2 \pm 6.7$	$31.8 \pm 6.6$	$7.8 \pm 3.5$	$5.4 \pm 2.9$	$2.6 \pm 2.1$	$0.8 \pm 1.5$
DY Data/MC	$2.06 \pm 0.20$	$2.18 \pm 0.23$	$2.94 \pm 0.61$	$2.28 \pm 0.50$	$2.78 \pm 1.31$	$5.95 \pm 3.35$	$6.45 \pm 5.33$	$7.73 \pm 16.00$
$SFR_{top}$	$1.96 \pm 0.50$	$2.05 \pm 0.55$	$2.49 \pm 0.81$	$2.03 \pm 0.59$	$2.27 \pm 0.84$	$4.16 \pm 1.84$	$4.37 \pm 2.13$	$4.62 \pm 2.16$

Table 4: As above, but taking double the  $\mu\mu$  channel yields instead of  $ee + \mu\mu$ .

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
MC	$42.5 \pm 1.5$	$36.8 \pm 1.4$	$12.5 \pm 1.2$	$16.0 \pm 1.4$	$5.0 \pm 0.8$	$1.7 \pm 0.3$	$0.7 \pm 0.1$	$0.5 \pm 0.1$
Data	60.0	60.0	26.0	22.0	12.0	8.0	4.0	2.0
Data/MC	$1.41 \pm 0.19$	$1.63 \pm 0.22$	$2.08 \pm 0.45$	$1.37 \pm 0.32$	$2.42 \pm 0.79$	$4.73 \pm 1.91$	$5.94 \pm 3.25$	$4.06 \pm 3.10$
DY MC	$29.5 \pm 0.7$	$24.9 \pm 0.8$	$4.6 \pm 0.3$	$5.3 \pm 0.6$	$1.4 \pm 0.2$	$0.6 \pm 0.1$	$0.2 \pm 0.1$	$0.1 \pm 0.0$
DY Data	$46.7 \pm 7.9$	$47.7 \pm 7.9$	$17.8 \pm 5.2$	$11.0 \pm 4.9$	$8.2 \pm 3.5$	$6.8 \pm 2.8$	$3.5 \pm 2.0$	$1.6 \pm 1.4$
DY Data/MC	$1.58 \pm 0.27$	$1.92 \pm 0.32$	$3.85 \pm 1.16$	$2.07 \pm 0.95$	$5.98 \pm 2.78$	$11.75 \pm 5.65$	$22.18 \pm 15.31$	$14.58 \pm 14.22$
$SFR_{top}$	$1.50 \pm 0.31$	$1.77 \pm 0.45$	$2.96 \pm 1.08$	$1.72 \pm 0.48$	$4.20 \pm 1.79$	$8.24 \pm 4.09$	$14.06 \pm 7.30$	$9.32 \pm 5.19$

Table 5: Now taking double the  $ee$  channel yields instead of  $ee + \mu\mu$ .

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
DY MC	$36.2 \pm 0.2$	$30.8 \pm 0.2$	$6.3 \pm 0.1$	$8.0 \pm 0.1$	$1.9 \pm 0.1$	$0.6 \pm 0.0$	$0.2 \pm 0.0$	$0.1 \pm 0.0$
DY Data	$57.2 \pm 0.6$	$51.3 \pm 0.6$	$19.6 \pm 0.4$	$21.3 \pm 0.4$	$7.5 \pm 0.3$	$3.3 \pm 0.2$	$1.7 \pm 0.1$	$0.5 \pm 0.1$
DY Data/MC	$1.58 \pm 0.02$	$1.67 \pm 0.02$	$3.09 \pm 0.08$	$2.66 \pm 0.07$	$3.89 \pm 0.19$	$5.21 \pm 0.37$	$7.44 \pm 0.68$	$4.24 \pm 0.67$

Table 6: After resampling all events by rotating the  $l^+l^-$  in the Z CM (both  $\theta$  and  $\phi$ ), and cutting on lepton  $p_T < 20$  GeV and  $|\eta| > 2.4$  after resampling.

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
DY MC	$47.8 \pm 0.3$	$40.8 \pm 0.3$	$8.7 \pm 0.1$	$11.0 \pm 0.2$	$2.5 \pm 0.1$	$0.8 \pm 0.0$	$0.3 \pm 0.0$	$0.2 \pm 0.0$
DY Data	$76.2 \pm 0.7$	$68.4 \pm 0.6$	$24.8 \pm 0.4$	$27.3 \pm 0.5$	$9.9 \pm 0.3$	$4.8 \pm 0.2$	$2.5 \pm 0.1$	$0.8 \pm 0.1$
DY Data/MC	$1.59 \pm 0.02$	$1.67 \pm 0.02$	$2.84 \pm 0.06$	$2.48 \pm 0.06$	$3.97 \pm 0.16$	$5.82 \pm 0.29$	$7.46 \pm 0.52$	$4.11 \pm 0.51$

Table 7: As above, but taking double the  $\mu\mu$  channel yields instead of  $ee + \mu\mu$ .

Sample	CR2PRESEL0	CR2PRESEL1	CR2A	CR2B	CR2C	CR2D	CR2E	CR2F
DY MC	$24.7 \pm 0.2$	$20.7 \pm 0.2$	$4.0 \pm 0.1$	$5.0 \pm 0.1$	$1.3 \pm 0.1$	$0.4 \pm 0.0$	$0.1 \pm 0.0$	$0.0 \pm 0.0$
DY Data	$38.2 \pm 0.5$	$34.3 \pm 0.5$	$14.4 \pm 0.3$	$15.3 \pm 0.3$	$5.0 \pm 0.2$	$1.8 \pm 0.1$	$0.9 \pm 0.1$	$0.2 \pm 0.1$
DY Data/MC	$1.55 \pm 0.02$	$1.65 \pm 0.03$	$3.64 \pm 0.11$	$3.05 \pm 0.10$	$3.75 \pm 0.25$	$4.05 \pm 0.44$	$7.38 \pm 1.09$	$4.82 \pm 1.23$

Table 8: As above, but taking double the  $ee$  channel yields instead of  $ee + \mu\mu$ .